

CLAIMS

What is claimed is:

1. A method for improving signal quality within a radio frequency (RF) receiver, said
2 method comprising:

3 down-converting an image of a desired signal to a baseband signal;

4 determining an energy of said baseband signal;

5 in response to a determination that said energy of said baseband signal being
6 equal to or greater than a predetermined threshold, swapping IF for an incoming
7 signal; and

8 in response to a determination that said energy of said baseband signal being
9 less than said predetermined threshold, maintaining IF for an incoming signal.

1 2. The method of Claim 1, wherein said method further includes continuing normal
2 signal processing.

1 3. The method of Claim 1, wherein said down-converting is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

3 where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

4 f_{CH} = a channel frequency within said RF receiver

5 f_{IF} = an IF signal frequency within said RF receiver

6 and adjusting a digital complex sinusoid signal within an intermediate frequency local
7 oscillator (IFLO) by

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

1 4. The method of Claim 3, wherein said swapping IF is performed by

$$f_{RFLO} = f_{CH} + f_{IF}$$

3 where f_{RFLO} = said local oscillation frequency

4 f_{CH} = said channel frequency

5 f_{IF} = said IF signal frequency

6 and

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

5. The method of Claim 4, wherein said maintaining IF is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos \omega_{IF}t - j \sin \omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

6. The method of Claim 1, wherein said down-converting is performed by

$$f_{RFLO} = f_{CH} + f_{IF}$$

where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

f_{CH} = a channel frequency within said RF receiver

f_{IF} = an IF signal frequency within said RF receiver

and adjusting a digital complex sinusoid signal within an intermediate frequency local oscillator (IFLO) by

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

7. The method of Claim 6, wherein said swapping IF is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

8. The method of Claim 7, wherein said maintaining IF is performed by

$$f_{RFLO} = f_{CH} + f_{IE}$$

where f_{RELO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

9. The method of Claim 1, wherein said down-converting is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

f_{CH} = a channel frequency within said RF receiver

f_{IF} = an IF signal frequency within said RF receiver

adjusting a digital complex sinusoid signal within an intermediate frequency local oscillator (IFLO) by

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

and

swapping signals paths of an in-phase IF signal and a quadrature IF signal.

10. The method of Claim 9, wherein said swapping IF is performed by

$$f_{RFLO} = f_{CH} + f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

maintaining signals paths of said in-phase IF signal and said quadrature IF signal.

11. The method of Claim 10, wherein said maintaining IF is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RELO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

swapping signals paths of said in-phase IF signal and said quadrature IF signal.

12. The method of Claim 1, wherein said down-converting is performed by

$$f_{\text{RELO}} = f_{\text{CH}} + f_{\text{IE}}$$

where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

f_{CH} = a channel frequency within said RF receiver

f_{IF} = an IF signal frequency within said RF receiver

adjusting a digital complex sinusoid signal within an intermediate frequency local oscillator (IFLO) by

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

and

swapping signals paths of an in-phase IF signal and a quadrature IF signal.

13. The method of Claim 12, wherein said swapping IF is performed by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

maintaining signals paths of said in-phase IF signal and said quadrature IF signal.

14. The method of Claim 13, wherein said maintaining IF is performed by

$$f_{\text{RELO}} = f_{\text{CH}} + f_{\text{IF}}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

swapping signals paths of said in-phase IF signal and said quadrature IF signal.

1 15. A radio frequency (RF) receiver comprising:

2 means for down-converting an image of a desired signal to a baseband
3 signal;

4 means for determining an energy of said baseband signal;

5 means for swapping IF for an incoming signal, in response to a
6 determination that said energy of said baseband signal being equal to or greater than
7 a predetermined threshold; and

8 means for maintaining IF for an incoming signal, in response to a
9 determination that said energy of said baseband signal being less than said
10 predetermined threshold.

1 16. The RF receiver of Claim 15, wherein said means for down-converting performs a
1 down-conversion by

2 $f_{RFLO} = f_{CH} - f_{IF}$

3 where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

4 f_{CH} = a channel frequency within said RF receiver

5 f_{IF} = an IF signal frequency within said RF receiver

6 and adjusting a digital complex sinusoid signal within an intermediate frequency local
7 oscillator (IFLO) by

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

1 17. The RF receiver of Claim 16, wherein said means for swapping IF swaps IF by

2 $f_{RFLO} = f_{CH} + f_{IF}$

3 where f_{RFLO} = said local oscillation frequency

4 f_{CH} = said channel frequency

5 f_{IF} = said IF signal frequency

6 and

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

1 18. The RF receiver of Claim 17, wherein said means for maintaining IF maintains IF
2 by

3 $f_{RFLO} = f_{CH} - f_{IF}$

4 where f_{RFLO} = said local oscillation frequency

5 f_{CH} = said channel frequency

6 f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

1 19. The RF receiver of Claim 15, wherein said means for down-converting performs a
2 down-conversion by

3 $f_{RFLO} = f_{CH} + f_{IF}$

4 where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

5 f_{CH} = a channel frequency within said RF receiver

6 f_{IF} = an IF signal frequency within said RF receiver

7 and adjusting a digital complex sinusoid signal within an intermediate frequency local
8 oscillator (IFLO) by

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

20. The RF receiver of Claim 19, wherein said means for swapping IF swaps IF by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos \omega_{IF}t - j \sin \omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

21. The RF receiver of Claim 20, wherein said means for maintaining IF maintains IF

by

$$f_{RFLO} = f_{CH} + f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

1 22. The RF receiver of Claim 15, wherein said means for down-converting performs a
2 down-conversion by

3 $f_{RFLO} = f_{CH} - f_{IF}$

4 where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

5 f_{CH} = a channel frequency within said RF receiver

6 f_{IF} = an IF signal frequency within said RF receiver

7 adjusts a digital complex sinusoid signal within an intermediate frequency local
8 oscillator (IFLO) by

$$IFLO(t) = e^{-j\omega_{IF}t}$$

where $e^{-j\omega_{IF}t} = \cos\omega_{IF}t - j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

9 and swaps signals paths of an in-phase IF signal and a quadrature IF signal.

1 23. The RF receiver of Claim 22, wherein said means for swapping IF swaps IF by

2 $f_{RFLO} = f_{CH} + f_{IF}$

3 where f_{RFLO} = said local oscillation frequency

4 f_{CH} = said channel frequency

5 f_{IF} = said IF signal frequency

6 and maintains signals paths of said in-phase IF signal and said quadrature IF signal.

24. The RF receiver of Claim 23, wherein said means for maintaining IF maintains IF by

$$f_{\text{RELO}} = f_{\text{CH}} - f_{\text{IF}}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and swaps signals paths of said in-phase IF signal and said quadrature IF signal.

25. The RF receiver of Claim 15, wherein said means for down-converting performs a down-conversion by

$$f_{RFLO} = f_{CH} + f_{IF}$$

where f_{RFLO} = an oscillation frequency of a local oscillator within said RF receiver

f_{CH} = a channel frequency within said RF receiver

f_{IF} = an IF signal frequency within said RF receiver

adjusts a digital complex sinusoid signal within an intermediate frequency local oscillator (IFLO) by

$$IFLO(t) = e^{+j\omega_{IF}t}$$

where $e^{+j\omega_{IF}t} = \cos\omega_{IF}t + j\sin\omega_{IF}t$

$$\omega_{IF} = 2\pi f_{IF}$$

and swaps signals paths of an in-phase IF signal and a quadrature IF signal.

26. The RF receiver of Claim 25, wherein said means for swapping IF swaps IF by

$$f_{RFLO} = f_{CH} - f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and maintains signals paths of said in-phase IF signal and said quadrature IF signal.

27. The RF receiver of Claim 26, wherein said means for maintaining IF maintains IF

by

$$f_{RFLO} = f_{CH} + f_{IF}$$

where f_{RFLO} = said local oscillation frequency

f_{CH} = said channel frequency

f_{IF} = said IF signal frequency

and swaps signals paths of said in-phase IF signal and said quadrature IF signal.